Title

A Pilot Study for Panic Disorder Using Exome Sequencing Data, and System Level Modeling for Dendritic Cell Biogenesis

Abstract

Panic disorder (PD) is an anxiety disorder characterized by repeated attacks of intense fear that something bad will occur when not expected. The lifetime prevalence is about 5%, and genetic association is identified recent in Japanese populaion. This study uses exome sequencing data from 20 individuals to investigate the genetic variants associated to PD. Several pipelines were applied to the data to call variants, and the results were compared to select the proper pipeline. The SNPs called via GATK multi-sample variant calling were further analyzed, and several genes were suggested. These results also suggest that variant-calling is complicated, and a tool for the task over family-based samples is in need.

Dynamics of classic dendritic cells (DCs) in life cycle is crucial to their functions on antigen-presentation and initializing immune responses, as well as to proper applications to medical therapies. However, the present knowledge about the life cycle of DCs is still limited. In this study, we build a mathematical model at system level for the cell populations along the DC developing pathway, to investigate DC dynamics in both steady state and stimulated states. When applied to DC homeostatic turnover, the model can be approximated by a steady-state model under norm conditions, which generates effective estimation of biological parameters. In line with Flt3L-induced experiments, we utilize part of the model to search parameter settings well fitted to the observed data, and conclude that Flt3L-enhanced DC proliferation exceeds the death.